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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/846,173	04/30/2001	Shih-Yen Lin	AB-1133 US	4181

7590 10/10/2002

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EXAMINER

BEREZNY, NEAL

ART UNIT PAPER NUMBER

2823

DATE MAILED: 10/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/846,173

Applicant(s)

LIN ET AL.

Examiner

Neal Berezny

Art Unit

2823

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-22 is/are rejected.
- 7) ☒ Claim(s) 19 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Examiner acknowledges applicant's election, without traverse, of the Group II invention, claims 16-22, drawn to an IR detector device.

Claim Objections

2. Claims 19 and 21 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 18 requires the quantum dot layer be composed of InAs, while claim 19 requires the quantum dot layer to be InGaAs. Claim 21 provides the possibility of the first AlGaAs layer to be all Al, which no longer has GaAs, so the materials are mutually exclusive.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application

being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)). Claims 16-17 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Fafard et al. (6,239,449). Fafard teaches building a quantum dot infrared photodetector structure comprising a gallium arsenide substrate, fig.1, el.2, a first gallium arsenide layer as a first buffer layer, el.4, a first undoped aluminum gallium arsenide layer as a blocking layer, el.12, a quantum dot structure layer, el.14, a second undoped aluminum gallium arsenide layer as a second buffer layer, el.18, a second gallium arsenide layer as a contact layer, el.30, see also col.5, ln.1-9, wherein said first gallium arsenide layer and said second gallium arsenide layer are n-type gallium arsenide layers, col.5, ln.65-66, wherein the aluminum content of the first and second aluminum gallium arsenide layer range from 10% to 100% by weight, col.6, ln.3-19.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 18-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fafard et al. (6,239,449), as applied to claims 16-17 and 21 above. Fafard also teaches forming a quantum dot infrared detector wherein said quantum dot structure

layer is formed by multiple layers comprising indium arsenide quantum dots and wherein said quantum dot structure layer is made of one of silicon/silicon germanium composite indium gallium arsenide barrier layer, col.5, ln.1-9, col.2, ln.65 to col.3, ln.13. Further, Fafard teaches a structure wherein the number of said multiple layers is ranged from 3 to 100, col.8, ln.59-69.

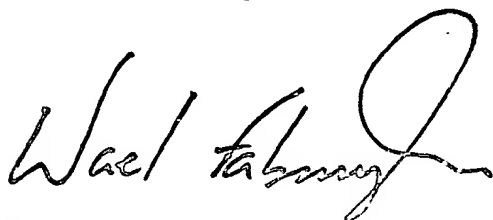
7. Fafard appears not to specifically state that the quantum dot structure is formed under an arsenic deficient condition, nor buried in an undoped gallium arsenide barrier layer, nor wherein the first gallium arsenide layer has a thickness of about 1 micron. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the InAs quantum dots under an As deficient condition so as to stress the active semiconductor layer lattice structure, which is well known to facilitate the generation of electron-hole pairs, thereby performing the functional equivalence of doping the semiconductor. Further, It would have been obvious to one of ordinary skill in the art at the time of the invention to use undoped GaAs as a barrier layer in the quantum dot structure because undoped GaAs is well known to be an effective barrier material and would act as a functionally equivalent material, see col.5, ln.38-47. Finally, It would have been obvious to one of ordinary skill in the art at the time of the invention to use a buffer layer of about 1 micron to provide an effective buffer between the substrate and the blocking layer. Further, it is well known in the art to vary geometries and it has been found that unless applicant can demonstrate the critical nature of a dimension, it would be well within the skill of an ordinary artisan to vary dimensions.

CONCLUSION

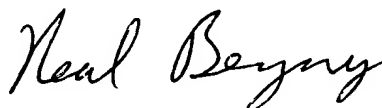
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neal Berezny whose telephone number is (703) 305-1481. The examiner can normally be reached on Monday to Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached at (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2000



10-1-02

Neal Berezny

Patent Examiner

Art Unit 2823